Functional Enhancement for Facility Management Services

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Abstract

Our AQUA SMART CLOUD (ASC) facility management service is based on a water supply facility ledger that can centrally manage information on on-site facilities and equipment. Its web application provides the functions necessary for facility management work, such as functions for patrol inspection work, managing repair and maintenance history of facilities and equipment, and managing documents such as drawings and instruction manuals. These functions are provided as Web applications and can be used with major web browsers.

In October 2019, the Water Supply Act was partially revised in that the water utility must prepare an accounting ledger and store the data. Appropriate management of the water supply facility ledger will be increasingly required in the future.

We added digital functions recommended by the Ministry of Health, Labor and Welfare's "Guidelines for introducing a simple electronic system for water supply facility ledgers". We also added functions to cope with issues in the water utility business, such as the challenge of the wider servicing area deterioration (aging) of water supply facilities and the shortage of facility management personnel. In doing so, we support further operational efficiency and stable operation of water supply facilities.

1 Preface

Customers involved in the water supply business face a variety of issues, such as the deterioration (aging) of water supply facilities, responding to replacement demands, aging of facility maintenance personnel, and a shortage of service engineers. In addition, the revision of the Water Supply Act made it obligatory to prepare a water supply facility ledger.

In order to assist our customers in resolving such issues, we are working to expand the functions of our facility management services. This paper presents an overview of the functions of the facility management services and introduces the functions that have been expanded up to 2021.

2 Outline of Facility Management Service Functions

Table 1 shows a list of facility management service functions. The facility management service was launched in 2014 for local governments and maintenance management service providers, and provides functions such as facility ledger, document management, inspection support (planning, recording, and report output), machine history management, and inventory management.

2.1 Functions for Facility Ledger and Document Management

Facility ledger and document management is a function for registering, storing, and managing documents such as specification information, drawings, and instruction manuals for water facilities and equipment. Fig. 1 shows an example of the facility ledger screen. Information managed in the cloud can be searched and checked at any time using PCs or internet-ready smart devices such as tablet PCs, and smartphones from anywhere. In the event of any equipment failure of water facility, equipment information, such as the date of manufacture and name of manufacturer, can be checked to quickly initiate steps for recovery.

Table 1 List of Facility Management Service Functions

A list of existing and extended functions of facility management service functions is shown.

Function name	Functional overview
Facility ledger	・Control of specification data for facilities and equipment
Document controls	・Management of instruction manuals, drawings, and completion books relating to facilities and equipment ・Linkage to each function (Facility ledgers, machinery control, inventory control) ・Retrieval based on types and keywords
Inspection support (Planning)	・Establishment of inspection programs for each inspection table ・Browsing and revision of inspection results
Inspection support (Record)	・Inspection result inputting for each inspection table in the order of planning ・Off-line inspection enabling by making patrol inspections with a tablet ・Photo registration and comment inputting during inspection
Inspection support (Ledger output)	・Inspection result outputting to Excel type ledger files
Machine history control	・Control of failure information and maintenance data for equipment
Inventory control	・Control of warehousing and stocktaking for components and spare parts
Work ledger	・Control and retrieval of work-related information
Repair and maintenance planning	・Establishment, comparison, and past data reference for repair and maintenance planning
Automatic inspection data gathering	・Automated acquisition of inspection input values for telemetry data of wide-area monitoring services
Limitation of ledger specification data disclosure	・Settings for the specification data disclosure limitation regarding facility ledgers, machine history control, and work ledgers

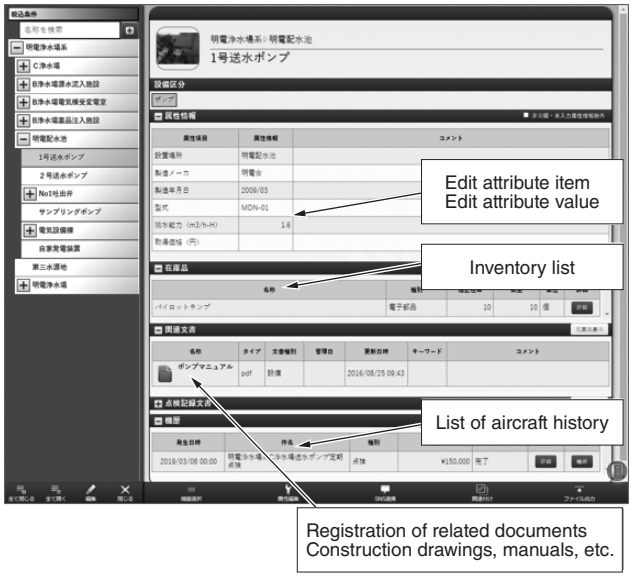

Fig. 1 Example of Facility Ledger Screen

It is possible to check facility equipment information such as specification data of facility equipment, machinery history data, inventory data, and related documents by displaying related machinery site, facilities, and facility equipment in hierarchical mode.

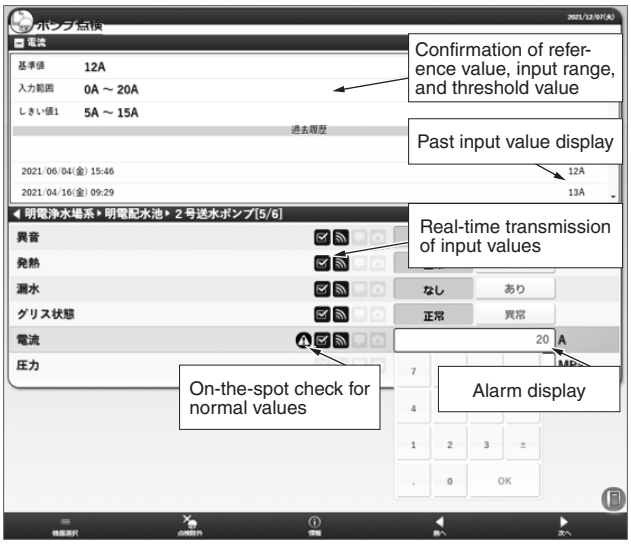

Fig. 2 Example of Inspection Input Screen

It is possible to check equipment data that is used to examine the range of input, threshold values, and the result of past inspection.

2.2 Functions for Inspection Support

If information about inspection is kept on the Web browser in advance, it is possible to carry out inspection in a remote mountain area or underground where it is difficult acquire a network signal. During inspection, it is also possible to check information about equipment, such as its input range, threshold value, and a result of past inspection. In addition, incorrect input can be restricted by using an indicating alarm to avoid reworking for the improvement of working efficiency. Fig. 2 shows an example of an inspection input screen.

2.3 Functions for Facility and Equipment History Management

The management of facility and equipment history is a function to control maintenance-related information about failures and repair history. In conjunction with facility ledgers, it is possible to grasp failure frequency and the state of deterioration in each facility and equipment. Fig. 3 shows an example of a detailed facility and equipment history management screen.

2.4 Functions for Inventory Management

These functions are used for the inventory control to adequately manage the quantities of spare parts and consumables. When a QR code is utilized, warehousing and stocktaking can be efficiently carried out. Fig. 4 shows an example of inventory management screen.

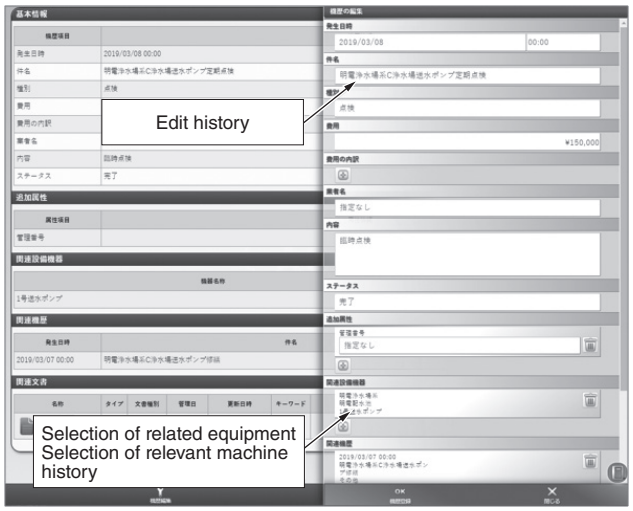

Fig. 3 Example of Detailed Facility and Equipment History Management Screen

It is possible to register the maintenance-related information about errors and repair services, maintenance data, related facility equipment, and documents.

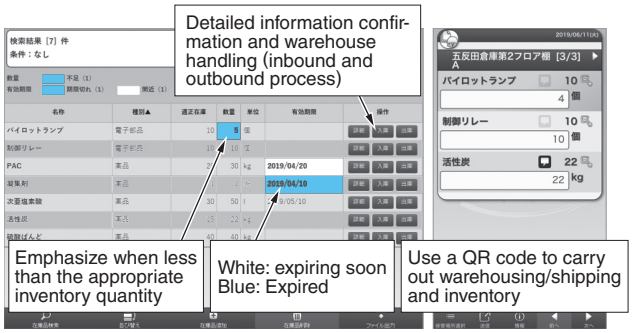

Fig. 4 Example of Inventory Management Screen

Adequate inventory and the term of validity can be managed for spare parts and consumables.

3 Outlines of Enhanced Functions

For the functions recommended in the "Guidelines Relating to Introduction of Simplified Electronic Systems for Waterworks Ledgers" proposed by Ministry of Health, Labour, and Welfare in Japan, we extended part of these indispensable functions for facility management based on our customers' requirements.

3.1 Functions for Work Ledgers

Functions for work ledgers are intended to control repair and overhaul work for facilities and equipment based on each work history. It is possible to easily retrieve and grasp the outlines of work, the year of work, the cost of work, and name of the vendor. It is also possible to perform centralized management through linked registration of facilities, equipment, facility and equipment history, and other relevant documents. Fig. 5 shows an example of a work ledger screen.

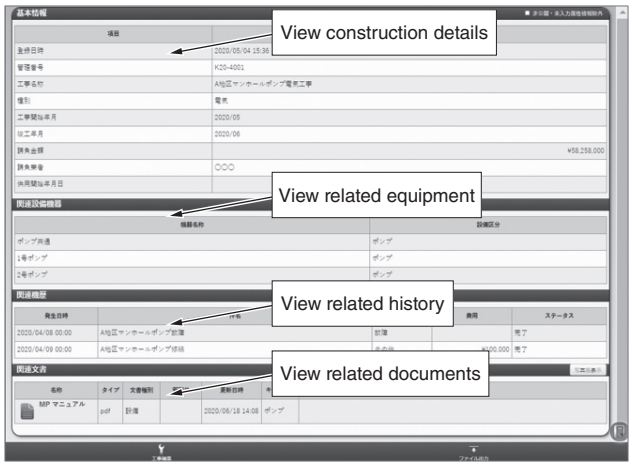

Fig. 5 Example of Work Ledger Screen

For each work, outlines of work, year of work, cost, contractor name, and related data can be managed by recording the contents of repair and overhaul services for facilities and equipment.

3.2 Functions for Repair and Maintenance Planning

For repair and maintenance planning, it is possible to provide information and data useful for cost reduction of the lifecycle. For this purpose, annual costs for repair, overhaul, and renovation work are visualized for each facility and equipment through tables and graphs, and short-term and mid-term costs for repair and maintenance planning are simulated. This simulation is based on and referred to: past costs, expected design life, and level of facility health. Fig. 6 shows an example of a repair and maintenance planning screen.

3.3 Functions for Automatic Inspection Data Gathering

As one of AQUA SMART CLOUD (ASC) services, a wide-area monitoring service is offered to monitor multiple facilities at different sites. If a telemetering item by this wide-area monitoring service falls under an object of inspection, wide-area monitoring data is regarded as an inspection input value and a function of automatic data gathering is offered so that an inspector's inputting time can be saved and overall inspection work time can be shortened.

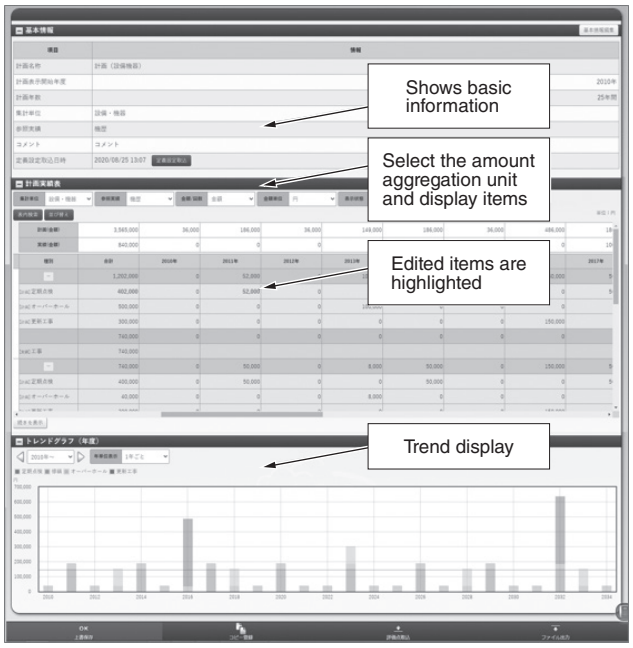

Fig. 6 Example of Repair and Maintenance Planning Screen

It is possible to simulate short-term and mid-term repair and maintenance planning by calculating the annual cost needed for repair and overhaul services and renovation work for each lot of facilities and equipment.

3.4 Ledger's Specification Information Display Restriction Function

As a result of the expansion of water supply service servicing areas, some public water utilities are subcontracting facility managements to several vendors. By setting restrictions on the information displayed in the ledger, it is possible for public water utility to allow designated vendors to only browse, edit, and manage the information of the facilities covered under each facility management service contract.

4 Postscript

Among ASC services, we have provided an overview of the functions of facility management services that specialize in repair and maintenance work, as well as newly expanded functions.

By implementing the expanded functions, we attained the performance level that customers are looking for.

In the future, we will continue to utilize new technologies and aim to provide facility management service functions considering the convenience for the customers.